




IN THE CLAIMS:

CLEAN VERSION OF THE AMENDED CLAIMS

1. (amended) A built-up camshaft comprising a pipe coated by a jointing coating on an outer cylindrical surface and an inner cylindrical surface and having an outer pipe diameter and an inner pipe diameter and having cam places, bearing ring places and pipe end places;

 cams formed as rings with an outer cylindrical flange and an inner cylindrical flange and provided with the jointing coating on an inner cylindrical surface of the inner cylindrical flange and positioned at the cam places and bearing rings provided with the jointing coating on inner surfaces being in contact with the pipe and positioned at the bearing ring places and end pieces provided with the jointing coating on outer cylindrical surfaces and having an outer end pieces diameter bigger than the inner pipe diameter, wherein the jointing coating of the pipe and the jointing coating of the cams, the bearing rings and the end pieces create durable joints between the pipe and the cams, the bearing rings and the end pieces and wherein the surface coating prevents a tribocorrosion and increases load capacity as compared to bare compression joints.

2. The built-up camshaft according to claim 1, wherein the jointing coating is a joint-stable conversion coating.

3. The built-up camshaft according to claim 1, wherein the jointing coating is a cement coating.

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4. The build-up camshaft according to claim 1, wherein at least one of the pipe, the cams, the end pieces, the bearing rings are made out of one of the group of metal, ceramics, plastics by one of cutting, non-cutting, milling, forging in at least one of massive and profiled form.

5. The built-up camshaft according to claim 1, wherein the outer cylindrical surface and the inner cylindrical surface of the pipe is at least partially mechanically machined.

6. A built-up camshaft comprising
a pipe coated with a crystalline phosphate coating on an outer cylindrical surface and on an inner cylindrical surface and having an outer pipe diameter and an inner pipe diameter;
cams and bearing rings and end pieces having an outer diameter bigger than the inner pipe diameter and connected by means of compression joints to the pipe and provided with the crystalline phosphate coating on surfaces being

in contact with the pipe, wherein the crystalline phosphate coating prevents a tribocorrosion and increases load capacity as compared to compression joints and creates stable joints between the pipe and the cams, the bearing rings and the end pieces.

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7. A built-up camshaft comprising

a pipe coated by a cement on an outer cylindrical surface and an inner cylindrical surface and having an outer pipe diameter and an inner pipe diameter;

cams and bearing rings and end pieces having an outer diameter bigger than the inner pipe diameter and connected by means of compression joints to the pipe and provided with the cement on surfaces being in contact with the pipe, wherein the cement prevents a tribocorrosion and increases load capacity as compared to compression joints.

8. (new) A method for building a camshaft comprising making a pipe having an outer pipe diameter and an inner pipe diameter; coating the pipe with a jointing coating on an outer cylindrical surface and on an inner cylindrical surface;

making cams in form of rings with an outer cylindrical flange and an inner cylindrical flange and having a cam opening diameter smaller than the outer pipe diameter;

coating cams with the jointing coating on surfaces to be placed in contact with the pipe;

making bearing rings having an inner bearing ring diameter smaller than the outer pipe diameter;

coating the bearing rings with the jointing coating on surfaces to be placed in contact with the pipe;

making end pieces having an outer end piece diameter smaller than the inner pipe diameter;

coating the end pieces with the jointing coating on surfaces to be placed in contact with the pipe;

connecting the cams, the bearing rings, and the end pieces by means of compression joints to the pipe;

and allowing the jointing coating to create stable joints between the pipe and the cams, the bearing rings and the end pieces by hardening the jointing coating.

9. (amended) A built-up camshaft comprising
a pipe coated with a crystalline phosphate coating on an outer cylindrical surface and having an outer pipe diameter;
a cam having an inner diameter larger than the outer pipe diameter and connected by means of a compression joint to the pipe and provided with the crystalline phosphate coating on surfaces being in contact with the pipe,

wherein the crystalline phosphate coating prevents a tribocorrosion and increases load capacity as compared to compression joints without coating and creates a stable joint between the pipe and the cam;

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a bearing ring having an inner diameter larger than the outer pipe diameter and connected by means of a second compression joint to the pipe and provided with a second crystalline phosphate coating on surfaces being in contact with the pipe, wherein the second crystalline phosphate coating prevents a tribocorrosion and increases load capacity as compared to compression joints without coating and creates a stable joint between the pipe and the bearing ring;

an end piece having an inner diameter larger than the inner pipe diameter and connected by means of a third compression joint to the pipe and provided with a third crystalline phosphate coating on surfaces being in contact with the pipe, wherein the third crystalline phosphate coating prevents a tribocorrosion and increases load capacity as compared to bare compression joints and creates a stable joint between the pipe and the end piece.

10. A built-up camshaft comprising
an elongated part having an outer cylindrical surface;
a cam connected by means of a longitudinal compression joint to the elongated part, wherein the cam is covered with a joint-stable surface coating, and wherein the surface coating prevents a tribocorrosion and increases the load capacity as compared to compression joints;

a bearing ring connected by means of a second longitudinal compression joint to the elongated part, wherein the cam is covered with a second joint-stable surface coating, and wherein the surface coating prevents a tribocorrosion and increases the load capacity as compared to compression joints;

an end piece connected by means of a third longitudinal compression joint to the elongated part, wherein the cam is covered with a third joint-stable surface coating, and wherein the surface coating prevents a tribocorrosion and increases the load capacity as compared to compression joints.

11. The camshaft according to claim 10, wherein the coating (2, 5) is a metal coating or a cement coating.

12. (amended) The camshaft according to claim 10, wherein the pipe, the cams, the end pieces, the bearing rings, and the other parts are made out of metal, ceramics, plastics or other materials, by cutting or non-cutting, by milling or forging in massive or profiled form.

13. The camshaft according to claim 1, wherein an outer jacket face of the pipe or of the solid rod has a drawn quality or is completely or partially mechanically machined.

14. The camshaft according to claim 10, wherein the elongated part having an outer cylindrical surface is a pipe.

15. The camshaft according to claim 10, wherein the elongated part having an outer cylindrical surface is a solid rod.

63 16. (amended) A built-up camshaft comprising a pipe,

cams,

bearing rings,

end pieces, and

other parts, wherein the cams (3), the end pieces (6), the bearing rings, and the other parts are connected by means of longitudinal compression joints to the pipe, wherein the parts to be connected are provided with a suitable surface coating, and wherein the surface coating prevents a tribocorrosion and increases the load capacity as compared to non-coated compression joints.

17. (new) A built-up camshaft comprising a solid rod,

cams,

bearing rings,

end pieces, and

other parts, wherein the cams (3), the end pieces (6), the bearing rings, and the other parts are connected by means of longitudinal compression joints to the pipe, wherein the parts to be connected are provided with a suitable surface coating, and wherein the surface coating prevents a tribocorrosion

and increases the load capacity as compared to non-coated compression joints.

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AMENDED VERSION OF THE AMENDED SPECIFICATION

Page 6, line 9, after "Fig. 1." has been amended as follows:

[The cam 3 shown in Fig. 1 is formed as a ring 31 with an opening 34 which offsets the center of the ring 31 and has an opening diameter slightly smaller than an outer pipe diameter. Additionally, the ring 31 is provided with an inner cylindrical flange 33 and an outer cylindrical flange 32".]

Page 6, line 12, after "pressed in." and before the insert of the amendment dated January 12, 1999, the application has been amended as follows:

[The outer diameter of the end piece 4 is slightly larger than an inner diameter of the pipe 1.]

Page 6, line 13, has been amended as follows:

[10 provided with the cams 3 and bearing rings 6" and substitute therefor --,
wherein all parts --.]

Page 6, line 14, has been amended as follows:

to be disposed on the pipe, are

Page 6, line 14, after "cams", has been amended as follows:

[10 and the bearing rings 6.]